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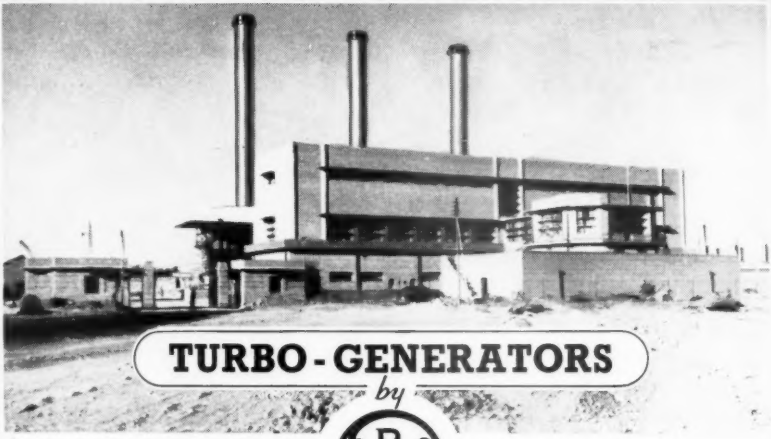

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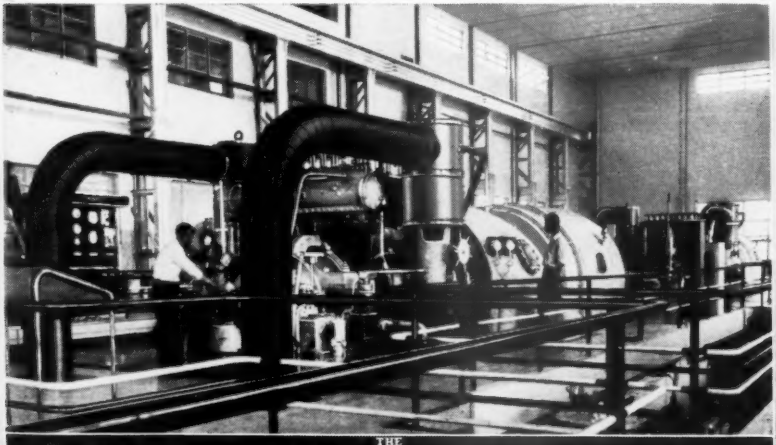

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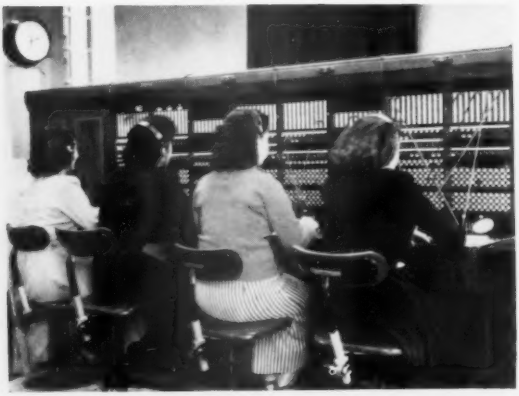
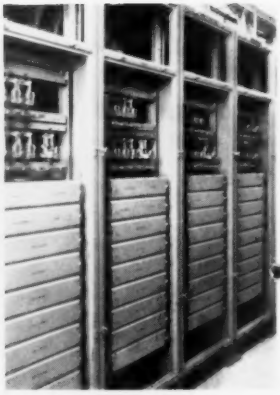
Below: Manual Board in use.

Right: Automatic Equipment Cabinets, showing the extension line circuits.

Extreme Right: Automatic Equipment Cabinets, showing the Group selector switches.





now KIRKUK TO BANIAS

When the original pipeline was laid from Kirkuk to Tripoli G.E.C. equipment was used to provide communications along the entire route. The small auto-manual telephone exchanges supplied for that purpose are giving such efficient service that they are being retained for the new pipeline from Kirkuk to Banias.

Positioned at various points along the route, they will be combined with new G.E.C. exchanges to form a complete network between the two towns.

At present there are 14 in all—5 of them in the Kirkuk area—ranging in size from 20 to 200 lines. Each one is specially designed to meet the requirements of the Iraq Petroleum Company and is amply protected against the climate.

The illustrations show a typical exchange at Tripoli Camp Legoult, one of the terminals of the existing route.

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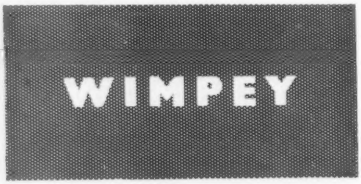

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OIL-WINNING IN ROUMANIA THIRTY YEARS AGO*

By E. BOADEN, O.B.E.† (Fellow)

Introduction

In 1924 Roumania was a kingdom straddling a portion of the Carpathian mountains and surrounded in a rather uncomfortable fashion by Russia, Poland, Czechoslovakia, Hungary, Yugoslavia, and Bulgaria, with a coast line on the Black Sea to the east and the Danube running along most of its southern border. Some of the neighbouring countries had claims on Roumania generally arising from the Peace Treaty of 1918. Russia had an older claim for Bessarabia. Hungary wanted Transylvania and the Banat, and Bulgaria a part of Dobroja. Nevertheless, the Roumanian government of the time did its best to consolidate these lands into a single Greater Roumania and in 1924 proceeded to legislate for a new, more comprehensive Mining Law. The first record of oil being produced in Roumania, the first-known country in Europe to produce oil, dates back to 1857, two years before the Drake well was drilled in Pennsylvania.

The Carpathian mountain range enters Roumania from the west, is cut by the Danube river at the Iron Gates and extends westwards some 200 miles before it turns north to join the Polish Carpathians after a further 220 miles.

The major oilfields are situated in the Old Kingdom on the southern flanks of these mountain ranges with minor fields on the eastern flanks in Moldavia. Nearly all production is derived from Pliocene formations, the reservoirs being of sand, usually very much faulted and often lying on salt domes or under salt thrusts. Nowadays production is ob-

*From a talk given to the Persian Gulf Branch of the Institute, 24 February 1952.

†Kuwait Oil Co.

tained down to 11,000-ft levels, but in 1924 it is doubtful if any well was deeper than 3,000 ft.

In contrast to many of the world's oilfields which lie in desert and inaccessible areas, the Roumanian fields largely lie in the attractive foothills of the Carpathians, which in places rise to peaks around 8,000 ft in height and are snow-capped for more than six months of the year. Large tracts of thick oak forests alternate with wide areas of vineyards and fruit orchards.

Prior to 1924, apart from state-owned forest lands, much of the countryside in the foothills was owned by peasants who were at liberty to concede their mineral rights and most lands in the areas then thought to be oil-bearing were held in concession by one or other concern.The laws of heritage in Roumania provided that when a land owner died his land should be equally divided among his heirs, and this was normally done by dividing his plot lengthways, for convenience in ploughing, into equal strips. After two or three generations many extremely narrow strips remained, some not more than ten feet wide but of considerable length. One concession owned by this writer's company measured 24 feet in width and ran up a hill and down dale through rivers, forests, and vineyards over a distance of five miles; naturally enough this strip was locally known as "The Rope". Until about 1942 no law existed in Roumania which afforded equal royalty rights to the owners of the strips of land which together had originally been concessioned out as one block.

Except on State lands concessions were given for a cash sum plus a percentage of royalty, normally varying from 6 to 15 per cent, on whatever oil was produced from the concession. Another clause provided for a scale of payments to cover surface rents and damage to crops. The unscrupulous concession hunter would instal himself in a village inn adjacent to the area in which he was interested and would entertain the small peasants royally until they were in a sufficiently malleable state to be driven to the nearest town where their concessions were ratified before the authorities. Once the area was fairly well covered, the blanks, which were often owned by the harder-headed peasants, had to be filled in. This was usually a more difficult proposition and royalty rates would rise sharply as the number of unconcessioned plots became less. Concessions obtained in this way often passed through many hands until they entered into the ownership of an oil company of standing. Rival concerns sometimes held alternate strips in concession and there might be overlapping claims on the same strip.

Thus a well might be sited on one of the small plots, the lucky owner of which would be entitled to receive the whole royalty from that well to the exclusion of his neighbours owning lands only a few feet distant. These, not unnaturally, would be infuriated at the unjust arrangement and would do all in their power to prevent right-of-way over their plots to the well site. Only after a redistribution of royalty or substantial cash payment would access to the site be obtained. There were many variations to this complex problem of rights of way and in many instances blood was shed before they could be settled. However, the system remained unchanged until 1942 when a new Petroleum Law provided for the inclusion of all plots into a well grid system with royalty rights for all proportional to the area of their individual holdings within the grids. In 1924 the Government took over the subsurface rights of lands as yet unleased and on such lands the State obtained a royalty from 8 to 15 per cent and the owner of the surface some 2 per cent. In addition, there was a State Tax of some 2½ per cent on all oil produced.

In the very early days oil was extracted through hand-dug shafts, many of which were still in use in 1924. These shafts, some over 600 ft in depth, were lined

with specially dovetailed oak billets laid billet by billet from the top as the hole was deepened. The shafts were a metre square and so straight over a vertical depth of 600 ft that on peering down one of them the tiny square of reflected light could be seen. Oil was dragged from this type of shaft in a wooden bucket suspended from a horse- or ox-driven winch made entirely of timber.

During the first world war the whole of the Roumanian oil industry was destroyed by Roumanian and British scorched earth action before the advancing German army. In 1924 attempts were being made to unplug wells plugged during the war, and in addition, 50 to 60 new wells were being drilled.

Drilling and Production in 1924

The rotary system had been introduced into the country a year or so previously, but its advantages were not wholly proved and most of the drilling was done using a wide variety of equipment of Polish, German, and Belgian manufacture. Many wells were being drilled with some variety of a flush percussion system. Essentially, in this system the bit was carried on a string of hollow rods about 2 to 2½ inches in diameter which were alternately raised by a type of walking beam and allowed to fall on bottom at a rate of possibly 6 to 8 strokes a minute, the whole string being rotated at the same time, powered by 4 to 5 men using chain tongs. Horizontal single-cylinder oil engines supplied power to the rig through flat belting and another set of similar engines drove a vertical 2 or 3-cylinder slush pump which provided the mud circulation to the bit. The whole installation was solidly set up on heavy concrete foundations as a well would rarely be completed in less than four months, a period occasionally extended to years by complicated fishing jobs. The latter were often carried out using sets of special left-hand thread fishing poles for unscrewing purposes. These themselves often broke up and further complicated the fishing problem.

There were several varieties of the percussion system in use at that time, some employing flush as described and others the use of solid one-inch rods which, after drilling a few feet of hole, had to be extracted and the cuttings bailed from bottom. There were also a number of cable tool rigs which did not differ much from those in general use today. In these the bit was carried together with a set of jars, sinkers, and rope socket on the end of a wire drilling line. The percussion motion was imparted by means of a walking beam to one end of which was fastened the wire line through a temper screw which gave the necessary adjustment for lowering the bit as drilling proceeded. A large wheel and drum, known as the bull wheel, was used for hoisting the drilling line when required, and a second large wheel and drum, the calf wheel, carried the casing line which through a set of blocks from time to time lifted the casing to keep it from becoming stuck. A smaller drum, the sand reel, carried the sand line on which was run the light bailer—used to recover cuttings from bottom after the bit was pulled—and other tools. Among these was a simple punch which with jars and sinker could with luck stab a piece of the formation from the bottom of the hole and was thus a forerunner of the core barrel. Another useful tool was the impression block filled with hard paraffin wax. With this an impression of any junk or the manner in which lost tools were lying in the hole could be obtained. A 12 by 12-inch single-cylinder steam engine supplied with steam from one boiler was the prime mover and transmitted power through a band wheel to the hoisting equipment and to the walking beam.

Some 15 to 20 ft per day could normally be drilled with the cable tool outfit, drilling being interrupted from time to time in order to move the casing with the aid of the calf wheel to prevent it

sticking. A first string of 26- or 28-inch riveted casing was set at 20 ft or so followed by successive strings each carried as deep as possible before it finally stuck. The motion of the bit in the hole was such that the newly-drilled hole was usually larger than the casing carried, but under-reamers were used in hard formations. It was common for a string to stick a very few feet below the shoe of the preceding one and as each string was only 2 inches smaller than its predecessor it was not unusual to run eight or nine before landing a final oil string 6 inches in diameter at 2500 ft after six or seven months' work. Years afterwards, when the well had ceased producing, these strings would be salvaged and re-used elsewhere.

The few rotary rigs in use at that time were very light affairs with 4 inch drum shafts and two hoisting speeds. There were no automatic catheads, water-cooled brakes, hydromatic brakes, sand reels, or weight indicators. The line-and drum shafts were carried by three jack posts bolted to the derrick proper and when moved from site to site the draw-works was broken down into component parts for easy transportation. These rigs were steam-driven by single-cylinder 12 by 12 inch engines fitted with fly wheels, and supplied with steam from a battery of two or three 80 to 100 h.p. boilers working at about 100 p.s.i, sited a legal minimum of 300 ft from the derrick. Slush pumps almost invariably had valve and cylinder cover leaks due to poor type of packing and ineffective hold-down arrangements. There were no blow-out preventers or cellars and drill pipe was sometimes run without tool joints. There were no spring hooks or standardized fishing tools.

As well spacings were usually about 180 ft it was common practice to install a central boiler house with which it would be possible to drill a number of sites. Much Roumanian crude is highly paraffinous and the boiler installations often remained as permanent features to supply steam for maintenance and heating purposes to the wells after they had come into production.

Derricks were made of timber, which was very cheap and, depending on the drilling system used, varied from 60 to 110 ft or so in height. The timbers were shaped out to a profile on the ground and erected in a matter of 5 to 6 days. Local carpenters were adept at this type of work.

Casing was of the inserted joint type and consequently had to be handled using a stationary and a lifting spider. A joint would be ready at the derrick door and the heavy lifting spider, the forerunner of the present-day casing elevator and attached to the lifting hook and block by a heavy multiwire sling, would be lowered and manhandled on over its collar. The slips would be beaten into place by sledge hammers and joint after joint would be pulled into the derrick in this way. Once suspended in the derrick, each joint was screwed into its predecessor using a rope and wire sling wrapped around the pipe, through the end of which was threaded a 15 ft long, stout oaken pole on which 10 to 15 men pulled and pushed until it was made tight.

Casing was not cemented. A shale bed at the appropriate depth would be selected, a small rat hole 3 to 4 ft deep was drilled ahead and the casing shoe set in it. The State mining authority would then conduct a water test. The hole was bailed until the water level stood at the prescribed depth of half the casing depth plus 30 ft. This level was accurately measured by a State official and the well sealed for 24 hours, at the end of which period the level was re-measured and if there was a rise of more than one or two feet the water test was considered unsatisfactory and had to be repeated.

During the drilling period the geologists would give their estimation of the depth at which the oil sands would be penetrated. Those wells which were being drilled with the rotary system usually

had casing set 50 to 60 ft above the expected oil sand, the rotary was pulled out, and cable tools installed to drill the well in. Some few feet before this depth was reached the derrick would be completely boarded in and a large area around the well bunded in with beaten down earth. Steam pumps with suctions into the bund and connexions to external oil lines would be installed on the bunds. A pair of 16 by 16-inch wooden beams tied together would be installed across the girths of the derrick specially reinforced for the purpose at a height of about 25 ft. One end of these would be fixed and the other free to slide along the opposite girth and on to this end were attached wires with which the beams could be manipulated. In the centre of the beam, directly over the well mouth would be mounted a fountain shield, a massive, slightly bell-shaped piece of cast iron about four feet in diameter and some ten inches thick. With these preparations completed, drilling would proceed and the oil sand be penetrated.

That penetration had in fact occurred was brought to one's notice in one of two ways. Either the well started bubbling gas and trickling liquid slowly, in which case tools were withdrawn as quickly as possible, or else liquid and tools together began to be ejected. In this contingency the only course was to get all personnel away as fast as they could run. The door of the derrick would be closed and the fountain shield pulled across in line with the hole. Many wells would roar away into their fountain shields for months on end, with gradually decreasing force, until they would finally plug themselves with sand and require to be cleaned out.

Vast quantities of sand were produced which would plug pipelines and fill the bunded areas, necessitating the building of new bunds. Pieces of rock would be thrown against the fountain shields producing large sparks but fortunately with no oxygen present to allow the gas to ignite. Other wells would plug periodically with large pieces of formation and after some hours blow themselves clear. The cutting action of the sand jetted into the fountain shield was tremendous during these open-flow periods and an 8-inch thick shield could be deeply pitted or even completely perforated in a few weeks.

After these preliminary bouts of open flow, during which rates of 6000 to 7000 barrels per day were occasionally attained for short periods, a time of swabbing, bailing, and cleaning would follow, and when the sand content had reduced itself to small proportions, which might take months or even years, the well would be put on the pump. Due to the quantities of sand produced during the open flow period, almost invariably it was not possible to clean out the well to bottom as the casing would be found to be damaged and even collapsed. It is evident that great fire risks were run, but except where there were nearby villages, people worried little and walked about in clouds of gas as a matter of course. When these gas clouds approached village areas, the local gendarmes were turned out in force to keep close watch that no fires were lit. In a winter temperature that sometimes registered 30° of frost their task was not an easy one and there is cause to wonder that disasters were not frequent. However, from time to time a fire would spread rapidly over the oil-soaked bunds until maybe eight or ten wells would be in flames and sometimes lives were lost. The boiler houses supplying the oil pumps with steam would have to be closed down, and in these cases unless the well plugged itself before the bunds were overflowing, fresh bunds and pumps had to be installed farther down the valleys where the area was gas-free.

Much of the labour used for ditching and dirty work generally was provided by the gipsies, who would cheerfully wade about in knee-deep pools of oil and clouds of gas day after day shovelling out sand.

It was not until about 1925 that attempts were made to produce oil in a controlled fashion and the first experiment that the writer remembers provided an 8-inch valve on the top of the oil string, into which was screwed an 8-inch solid steel plug with a 1-inch hole bored through the centre. The well flowed through this hole into the usual fountain shield for a time, then an old boiler shell was dragged in and suspended over the well mouth and connexions made to it so that the crude would be channelled away through one pipe and the gas drawn off by a blower through another. This rudimentary experiment led to revolutionary changes in methods of completion and by 1927-28 wells were completed through tubing and properly controlled through flow heads in much the same way as they are today.

Equipment

In 1924 the first experiments were being made to burn natural gas in oilfield boilers, workshops, and houses, crude oil having previously been the normal fuel. In the early 1920's the equipment in current use formed a very mixed collection indeed.

On any one field in course of being drilled up could be found two or three rotary rigs, half-a-dozen flush percussion outfits of various designs, and one or two cable tool rigs. Some of these with their auxiliary equipment might be new from the United States, some transferred from Poland, and some salvaged from the war destruction. There were no recognized standards in sizes or threads and the writer recalls cable tool tapered joints with six and with seven threads per inch on the same nominal size and 3-inch line-pipe having 8, 10, 11, and 11½ threads per inch. No standards existed, for example, regarding bolt circle diameters and sizes of bolt holes in flanges and it was often difficult to pick a pair out of a large pile of them. For these reasons, every centre of drilling and production activity had to have a sizeable machine shop, an important annexe to which was the blacksmith's shop. These shops were accustomed to turn out fishing tools to meet the almost infinite variety of jobs which turned up. The tools were made to the design of the engineer who happened to be in charge of the well which was in trouble and, needless to say, some of the designs were quite unorthodox and a number of them eventually joined the rest of the fish in the hole. Bit dressing was an important item in the work of the smith's shop; all bits in use were drag or percussion types, and the building up of bits with the torch and hard facing materials was unknown at that time.

Pipelines were screwed, welding equipment of any kind being scarce and seldom used. Pipelines were laid in ditches some four feet below ground level to prevent freezing. Even then, unless the earth was well tamped down above them water lines often froze.

Transport and Personnel

Most oil activities were confined to the Carpathian foothill country. Some of these hills are quite steep and are generally surfaced with clay which, when wet, cuts up quite badly and holds water. Road access to wells was, therefore, not always easy and in the development stages field roads were generally made up of stone spread on a mat of brushwood. Oil field haulage was exclusively by oxen and it was common to see as many as 32 pairs hauling a heavy boiler. In particularly sticky spots traction would be increased by introducing a block and tackle into the pulling gear and proceeding by stages. With oxen the art is to get them all to pull together and in the same direction. After a great deal of manœuvring, cracking of whips, and shouting, the concentrated effort would be achieved and a mighty load would be pulled a few feet at a time. Light loads would be hauled about in a two-wheeled cart drawn by a single pair of

oxen and a few mules were available for fast transport.

Personal transport for young engineers and supervisors was a two-wheeled pony cart with a small boy standing on the back to look after the horse. The field manager usually rode in a carriage and pair. Main transport over long distances was accomplished by a variety of Steyr, Stutz, and Fiat cars. The model T Ford made its appearance at about that time and gave good service.

Many workers who lived in villages ten miles or so away would walk to and from work each day. In winter and through the night they could be heard shouting to keep wolves at a distance as they walked in twos and threes through the forests. Travel on main roads was not too safe and from time to time travellers would be held up by armed bandits who would rob them and perhaps tie them to a tree but otherwise leave them unharmed.

From very early days the Roumanian State had instituted an excellent system of schools for the part-time training of promising young rig men to become drillers and for drillers to become foremen. This turned out some reliable foremen who, in the course of time, formed a sound nucleus on which the technical labour requirements of the industry were eventually expanded.

Development in Roumania

In 1900 Roumania produced an average of 4500 barrels of oil per day which was gradually increased to 35,000 barrels by 1914. The scorched earth policy of the war caused a drop to 10,000 barrels in 1917 and by 1924 production was back to its 1914 level. With new fields, modern methods, and deeper drilling a peak year was reached in 1936 when the daily average reached 174,000 barrels/day followed by a steady decline due to lack of new discoveries and political reasons down to a present probable figure of 70,000 barrels or so per day.

The crude oil produced in Roumania ranges in gravity from 29° to 39° API; a relatively small quantity makes excellent wax-free luboil stock but most of it is a paraffinous crude. As a result, hard paraffin deposits have to be cleared, sometimes daily from the tubing, flowheads heated, and flowlines 'godevilled' at frequent intervals. Due to the varying yields from different grades of crude, it is economical to keep them segregated and pumped separately but this means a multiplicity of lines and slugging problems. It is interesting to note that the products obtainable from a barrel of crude yielding good luboil stock will have a value about three times as great as the return from a barrel of paraffin-base crude.

As soon as the difficult post-war conditions had cleared up and materials became available, new and modern techniques were absorbed very quickly and the industry brought itself up-to-date. For example, about 1930 one of the deepest wells in the world of that time was drilled in Roumania and successfully carried down to below 10,000 ft.

The second world war brought a radical change in Roumanian affairs and the oil industry was nationalized in June 1948.

★ ★ ★

COMPANY PRODUCTION—CRUDE OIL

	Oct. 1952 *tons*
Iraq Petroleum Co. Ltd. (Kirkuk field)	1,808,211
Basrah Petroleum Co. Ltd. (Zubair field)	247,725
Mosul Petroleum Co. Ltd. (Ain Zalah)	51,744
Petroleum Development (Qatar) Ltd. (Qatar, Persian Gulf)	300,127
Kuwait Oil Co. Ltd.	3,165,327
	Nov. 1952 *brl.*
Kern Oil Co. Ltd.:	
California	106,148
Trinidad	74,674
British Controlled Oilfields Ltd. and subsidiary Co.:	
Western Venezuela	12,230
Eastern Venezuela	13,988

★ ★ ★

Antwerp Refinery: 1,583,256 tons of crude were refined during the first year, ended 30 September 1952, of operation at Antwerp refinery, a joint enterprise of AIOC and Petrofina.

AROUND THE BRANCHES

FAWLEY, LONDON, NORTHERN, PERSIAN GULF, SCOTTISH, SOUTH EASTERN, SOUTH WALES, STANLOW, TRINIDAD

Fawley Branch

The meeting at the Esso Recreation Club, Holbury, on 21 November 1952, had an attendance of 68. R. F. Archer of Babcock & Wilcox Ltd was the lecturer for the evening.

I. McCallum introduced Mr Archer who then presented a film entitled "Steam" which had been prepared to illustrate the principles embodied in water tube boiler design and operation, together with details of construction and manufacture. The story of this film is made up in three sections, viz. progress of boiler design and research—production—erection at site.

Following the film, Mr Archer gave replies to questions which were put to him. The large number and variety of these questions gave a good indication of the interest which Mr Archer had aroused. The meeting closed with a vote of thanks proposed by Dr A. W. Pearce.

London Branch

On Friday, 14 November, the London Branch held its third Buffet Dance at Manson House. This function, which is now a firmly established feature of the Branch's programme, was attended by about 120 members with their wives and friends.

At the London Branch Dance, Mr and Mrs E. C. Masterson (right) with Huntly Spence and Miss Annette Callow, who—

Once again the character of Manson House was transformed through the efforts of the Institute's General Secretary, D. A. Hough, and the tasteful arrangement of flowers in the hall contributed a gay and colourful background to the dance. This year, too, Eric Lambert, who acted most competently as M.C., brought along his excellent band which inspired the dancers to ever greater efforts. A good buffet and bar helped to complete the enjoyment of all present, although it was regretted that local regulations had

— later in the evening received from the London Branch Committee a silver salver as a gift on the occasion of their wedding the following day.

The Council Chamber at Manson House was a popular rendezvous for light refreshments.

prevented an extension of the licence.

The dance was proclaimed an outstanding success by everyone and wishes were expressed that a similar function should be held next year.

Persian Gulf Branch
Bahrein Sub-Area

At the meeting held on 16 November, 18 members or applicants for membership and four guests heard a talk by A. Garlick on "Gas laboratory techniques." R. Godfrey, sub-area chairman, presided.

The speaker traced the development of gas analysis from the early days of 1858, when the main problem was to study ventilation in mines by an analysis of the air, to the present-day problems involving the analysis of complex hydrocarbon mixtures. The talk was illustrated by means of diagrams.

In concluding his talk, Mr Garlick stressed the importance of correct sampling; if the sample was not representative of the stream on which information is required, the laboratory technician was "not doing analysis but merely running samples."

In the discussion which followed, the difficulty of sampling high pressure gas wells was mentioned inasmuch as under reservoir conditions a gaseous phase only existed, but under the reduced temperature and pressure at the well head a liquid phase was also developed. It was emphasized that correct gas analysis was necessary to guide the petroleum engineer in his reservoir studies.

Members now total 23 and there are as many more applicants for membership.

Scottish Branch

"Refinery electrification" was the subject of a paper given by F. N. Beaumont, AIOC, and G. A. McLennan, Scottish Oils Ltd., at the Branch meeting held at Grangemouth on 6 November 1952.

The authors reviewed the basic principles and the detailed development of the electrical networks used by AIOC in their refinery programme in the U.K., Europe, and in the new refineries to be erected in the Middle East and Western Australia, the new Grangemouth refinery being taken as an example of this sort of installation.

The first section of the paper dealt with the basic technical considerations of transmission, distribution, and fast-acting protective gear, while the second, illustrated by slides, showed the application of these principles to the actual installations in the power station, substations, and process plants throughout the refinery.

In refineries of this capacity, the main transmission voltage is 11 kV and from the main power station switchgear, radial feeders supply area sub-stations of 2,500 kVA capacity for the supply to process plants, and for pumping and loading purposes. At these sub-stations the voltage is stepped down to 3 phase, 3.3 kV for supplies to process plants, and for the direct on-starting of electric motors above 50 h.p.; to 440 volts, 3 phase, 4 wire, for the direct on-starting of motors up to 50 h.p., and for welding supplies. The single phase voltage of this supply is used for small power and lighting.

One of the important new developments is a complete range of remote-controlled unit type flameproof distribution and motor starter switchgear, for both 3.3 kV and 440 V. This equipment is covered by the Buxton Flameproof Certificate for Group II gases. Slides illustrated the technical features and protective gear devices. Throughout the whole network from motor to power station, the protection is closely integrated to give rapid clearance of electrical faults with the resulting minimum voltage disturbance, so as not to affect other running plant.

Emphasis was laid on the high degree of standardization resulting from the adoption of these methods of electrification.

Distribution throughout the refinery is by underground cable, and attention was drawn to a special design of cable joint to minimize corrosive or injurious attack by chemicals.

In regard to flameproof electric motors, the authors traced the development of oil-lubricated ball- and roller-bearing machines, and to plain journal-bearing machines, particularly in the large high speed motor sizes. Grease lubricated ball- and roller-bearing machines are restricted to a maximum of 70 h.p.

New developments in the field of flameproof lighting were described with particular reference to process plant control rooms, and road lighting.

Details were given of a new flameproof emergency steam-driven alternator for supplying power for emergency lighting and for electrical process instruments.

Reference was made to the use of a private automatic branch exchange for internal communications, and for access to the public telephone system, and to the flameproof street pillar installations for fire services throughout the refinery.

In conclusion, the authors suggested some fields of future development, particularly in the application of remote control for motors to be embodied in mimic process diagrams in central control rooms, and pointed out the economy to be gained by carrying such circuits over telephone cable networks. At the new Kent refinery, Isle of Grain, such a principle has been developed, and applied to the remote stopping of loading pumps in tank farm pumphouses from control points situated at the head of the loading jetties.

On 2 December, the Branch heard K. A. Spencer, B.Sc. Tech., A.M.I. Chem.E., deliver a most interesting lecture on "Practical cathodic protection in the oil industry." Mr Spencer had previously addressed the South-Eastern Branch of the Institute in April 1952 and his lecture on that occasion will be reproduced in full in an early issue of the *IP Review*.

More than sixty people attended the Scottish Branch meeting, the chairman being Mr Robert Crichton.

South-Eastern Branch

At the meeting held on 4 November, 1952, at the Small Corn Exchange, Rochester, R. P. Bell, a director of Messrs Berry Wiggins & Co., Ltd., presented a paper entitled "Bitumen and its uses."

It was obvious from the large number of exhibits displayed, and the excellent

Among those at the South-Eastern Branch Dance were (left) *Ronnie Leach and* (right) *Alan Deller, both from the London Branch and seen here with F. A. Maliphant, secretary of the S.E. Branch and his wife. Other guests included* (right in the right-hand picture) *Chief Officer A. J. Brown of the* British Skill, *which had just delivered the first crude oil cargo to the Kent refinery of AIOC, and Mrs Brown seen with* (left) *C. S. Cleverly, general manager, and Noel Grey, chairman of the Branch.*

slides which illustrated Mr Bell's talk, that he had gone to a great deal of trouble in the preparation of this paper, but he was recompensed by the interest shown by the members and visitors present.

The majority of those present were surprised to learn of the many uses to which bitumen could be put in this modern age.

Mr Bell dealt with the elements of bitumen production, the standard methods of test, the many types of bitumen produced, and some of its many applications.

At the first Annual Dance of the South-Eastern Branch held at the Corn Exchange, Rochester, on Saturday, 1 November, 1952, over 200 persons were present.

Among those who attended were the Mayor and Mayoress of Rochester—Councillor and Mrs Anderson; C. S. Cleverly, general manager, Kent Oil Refinery; A. W. Deller and R. F. Leach, chairman and secretary respectively, of the London Branch of the Institute of Petroleum, and G. Sell, Editor of the *I.P. Review*.

This social event proved to be a most enjoyable evening, the success of which could be attributed in no small way to the excellence of the buffet.

The Committee felt well rewarded for their efforts in organizing the dance and are eager to arrange further social functions.

At the meeting held at the King's Head Hotel, Rochester, on 2 December, Dr J. T. Tyson of the Esso Development Company, presented his entertaining paper entitled "Patents and portents." (See *I.P. Review*, Sept. 1951, p. 301-13).

At the close of the meeting, N. W. Grey, the chairman, thanked Dr Tyson for presenting such an interesting paper

A general view at the S.E. Branch dance and (right) *Mr and Mrs Grey and C. S. Cleverly.*

and it was unanimously agreed by those present that they now had a greater knowledge of the patent law.

South Wales Branch

Under the chairmanship of J. A. Green, the third meeting of the present session was held on 6 November 1952, at Llandarcy, to hear a lecture on "Fire fighting in the petroleum industry" by W. F. Redman, Chief Fire Officer for Swansea.

The lecturer opened his paper by stating that prior to 1937 fire brigades had little knowledge and little equipment with which to fight oil fires, but as the result of enemy action during the last war, many hard lessons were taught, leading to the development of the present M.F.G's 5, 10, 20, and 30 which supersede the old equipment. The following points were postulated for the adequate protection of refinery and storage tankage. (1) Complete co-operation with the local management; (2) complete co-operation with the firm's fire brigade; (3) thorough knowledge of access routes, water and foam supplies; (4) frequent visits of fire brigade personnel to the oil installation to keep *au fait* with developments or site changes; (5) enforcement of "No Smoking" regulations.

Mr Redman described how a fire chief in planning protection must allow his imagination to envisage a potential fire on a disastrous scale. The means of rapidly mobilizing man power and foam from a wide area was described.

The lecture was completed with films of the large oil fires caused by enemy action at Pembroke Dock and Thames Haven and one of the recent fire at Avonmouth Docks.

After an interesting discussion the vote of thanks was proposed by D. W. Thomas and seconded by E. Thornton.

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KUWAIT SUB-BRANCH DINNER

The first annual dinner of the Kuwait Sub-Branch of the Persian Gulf Branch of the Institute of Petroleum was held on 19 November, 1952, at the Guest House, Ahmadi. Eighty-seven people, including members and guests, sat down to an excellent meal under the chairmanship of Mr E. Boaden, O.B.E., and listened to a succession of very good speeches.

Sir Rupert Hay, K.C.M.G., K.C.I.E., C.S.I., H.B.M. Political Resident, Persian Gulf, was the Guest of Honour, and Major-General W. F. Hasted, C.B., C.I.E., C.B.E., D.S.O., M.C., Director of Development, Kuwait, was the principal speaker of the evening.

Other guests included C. M. Pirie-Gordon, Political Agent, Kuwait; J. MacPherson, General Manager, American Independent Oil Company; Lt. Col. G. C. L. Crichton, C.S.I., C.I.E., Controller, Finance Department, Kuwait; E. Duncan, American Consul, Kuwait.

Following the toasts to The Queen and to H.H. The Ruler of Kuwait, Major-General Hasted proposed the toast to The Oil Industry.

In his opening remarks he said that he knew nothing about the oil industry from the inside. The industry has risen against great difficulties and had contributed much to the prosperity of the world.

Speaking of the Institute of Petroleum in general, Major-General Hasted said that it had shown a great interest in education and standardization, and had recognized its responsibility in maintaining the links between science, industry, and education. He stressed the needs of education in view of the

At the Kuwait Dinner (left to right): *C. Pirie-Gordon* (Political Agent in Kuwait); *Lt. Col. G. C. D. Crichton, C.S.I., C.I.E.* (financial adviser to H.H. the Ruler of Kuwait); *J. MacPherson* (general manager, American Independent Oil Co.); *Col. Sir Rupert Hay, K.C.M.G., K.C.I.E., C.S.I.* (H.B.M. Political Resident, Persian Gulf); *E. Boaden, O.B.E.* (chairman, Persian Gulf Branch, and superintendent, production operations, Kuwait Oil Co.); *Enoch Duncan* (American Consul); *R. Godfrey* (chairman, Bahrein Branch); *Maj.-Gen. W. F. Hasted, C.B., C.I.E., C.B.E., D.S.O., M.C.* (Director of Development, Kuwait); *L. T. Jordan* (general manager, Kuwait Oil Co.).

fast-changing scene of engineering and science, and the need to understand what is needed.

"We must have a larger portion of the people on the earth with a scientific background," he said. "To approach the problems of the future a nation must have a balanced and scientific mind. What we are suffering from to-day, with all our national and international maladjustments, is scientific indigestion. Too much knowledge—and too few who understand it."

In reply to the toast, L. T. Jordan, general manager, Kuwait Oil Company, spoke of the changes in the oil industry during the past 25 years. He had, he said, started in the industry as a technician, but the field of knowledge had broadened so much that it was too much for any one man to cover. He felt that the Institute of Petroleum was one of the best mediums for disseminating knowledge.

The toast to the Institute of Petroleum was proposed by J. MacPherson. He spoke of the great men of the past who had great vision but who had never imagined the vastness of the industry of today. Mr MacPherson paid tribute to the Institute of Petroleum. It is a great institution developing many interesting ideas.

The reply to the toast to the Institute of Petroleum was made by F. Godfrey, Chairman of the Bahrein Sub-branch. He said that he felt privileged to be at the first large-scale gathering of the Persian Gulf Branch since its formation less than a year ago. He referred to the formation in 1913 in London of the Institution of Petroleum Technologists, and said that as the industry grew it was found necessary to broaden the scope of the organization to include people other than technologists. Thus, in 1938 the Institute was reorganized in its present form.

Mr Godfrey spoke of the harmony that exists within the industry itself, but pointed out that there was recently a certain amount of distrust and suspicion in the mind of the general public. "This suspicion and mistrust is born of ignorance of the complex ramifications of the industry and if we are to survive in the role of a free enterprise it is vital that we gain the confidence of the

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public." "This we tried to do," he said, "through the Institute of Petroleum, by publications, so that all members could answer questions intelligently."

In conclusion, he thanked Mr MacPherson for saying so many nice things about the Institute.

D. S. Curtis proposed the toast of the Chairman, Mr E. Boaden. He said that it was in the Spring of 1951 that Mr Boaden commenced working for the creation of this Branch, and in March 1952 authority was given. "It is solely due to his efforts that the Branch is now so firmly established with 111 members in Kuwait, and 40 in Bahrein.

The speaker referred briefly to Mr Boaden's distinguished war service and to his career in the industry. "We are," he said, "all indebted to Mr Boaden for his enthusiasm and energy with regard to the creation of this Branch, and esteem ourselves most fortunate to have him as its first Chairman."

Mr Boaden in reply thanked the previous speaker and related some of the circumstances which led to the formation of the Persian Gulf Branch of the Institute of Petroleum. "About two years ago," he said, "the Persian Gulf was producing about one-fifth of the oil supplies of the world, and to the best of my knowledge had no active association or opportunity where oilmen could meet to exchange ideas and improve their knowledge."

There were, however, members of the Institute scattered up and down the Gulf and it was a simple matter to gather them together and, with their aid, form this active Branch.

Mr Boaden then welcomed the guests and said how pleased they were to have as the Guest of Honour Sir Rupert Hay, and other distinguished guests here this evening. "The fact that all these gentlemen from distant parts have honoured us with their presence here this evening," he said, "is an indication that from small beginnings we are at last something, a live Branch of the Institute, and it gives us something even greater—the belief that as time goes on we shall be able to widen our activities and be of ever increasing value to our members and the industry."

Sir Rupert Hay in a few gracious words spoke of his pleasure at being present. He said that he knew little about the oil industry, but all that he knew was to their credit.

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U.S. NATURAL-GASOLINE AND CYCLE PLANTS

The production capacity of U.S. natural-gasoline and cycle plants on 1 January 1952 was 881,596 b.d., an increase of 163,691 b.d. since 1950.

Details of plants by type are given in Table I, and in Table II data as to capacity by products is given. The fractionator capacity is included in the total, as fractionators only refractionate mixtures received from other plants.

The figures are extracted from Bureau of Mines Information Circular 7645, which gives data by States and districts.

TABLE I

Type	*Number at 1.1.52*	*Capacity, b.d.*
Absorption	374	562,341
Compression	68	24,370
Charcoal	2	154
Refrigeration	1	9,050
Combination	29	34,479
Cycle	47	181,202
Total	521	811,596
Operating	506	808,077
Shut down	15	3,519

TABLE II

Product	*Output, b.d.*	
	Total	*Fractionator*
Propane	159,391	16,662
Butane	95,436	26,352
Butane-propane mixture	40,741	7,718
Isobutane	22,139	5,566
Isopentane	5,485	3,300
Natural gasoline, etc.	488,404	97,471
Total	811,596	157,069

IRAQ'S NEW PIPELINE

Formal Inauguration of 30-inch Line

Officially inaugurated on 18 November 1952 at Kirkuk by H.M. King Feisal II of Iraq and on 24 November at Banias by H.E. Brigadier-General Fauzi Selo, Chief of State of Syria, Prime Minister, was the new 30-inch pipeline recently completed by the Iraq Petroleum Company. Built at a cost of over £40 million, the new line is 555 miles long from Kirkuk in Iraq to the new terminal at Banias in Syria.

Actually the line has been in use since March 1952 when, although nearly 100 miles remained to be laid, it was possible to make use of the western section by connecting it at K.3 pump station to the eastern sections of the Kirkuk-Haifa lines which have been out of use for several years. The complete 30-inch line was fully completed in April 1952.

King Feisal of Iraq, assisted by the Prince Regent, opening the valve at K.1 pumping station.

H.E. Brigadier-General Fauzi Selo, Chief of State of Syria, and Sir John Cunningham toast the new venture.

The Kirkuk Ceremony

In the presence of a large gathering of diplomats, of Iraqi Ministers, of H. S. Gibson, C.B.E., managing director, and other directors of the IPC and associated British, French, and American companies, Admiral of the Fleet Sir John Cunningham, G.C.B., M.V.O., chairman of the Company, invited H.M. King Feisal to open the valve at K.1 pumping station which controls the flow of oil into the line.

Sir John Cunningham, at the luncheon which followed the ceremony, paid a tribute to those who by their efforts had enabled the line to be completed in April 1952 six months ahead of schedule. He outlined the development of the Iraq pipelines and its effect on the production from the Kirkuk oilfield.

Dealing with the materials and equipment needed to lay 555 miles of pipe weighing some 165,000 tons, he said that 7,000 Arabs and about 400 British and American technicians had worked on the project. As a result of their labours more than 14 million tons of crude oil would be delivered to the Mediterranean coast in 1952, three or four million tons more than anticipated

King Feisal and the Prince Regent with Sir John Cunningham and Mr H. S. Gibson.

and nearly double the 1951 total. This immediate rise in production was already yielding much larger revenue to the Government; and the Company was continuing to intensify its efforts towards the agreed minimum annual production of 22 million tons from Kirkuk and Mosul. With the annual minimum of 8 million tons from the Basrah Petroleum Company's Zubair field, it was expected to raise Iraq's total production to 30 million tons by 1955.

The arrangements by which the greater part of the oil revenues were utilized for the developments of the Development Board were an incentive to the personnel of the Company. The Company was happy to help with the provision of local amenities and its power station now provided all the electricity needed by Kirkuk. Since 1947 the Company had supplied water to the Kirkuk municipality and now offered to install at its own expense the town's own supply system from the Lesser Zab.

Concluding, Sir John Cunningham said the companies would like to make a donation of 50,000 dinars for charitable purposes throughout Iraq.

Oil Fundamental to Iraq

Dr Nadim al Pachachi, Minister for Economics, warmly congratulated the company and its engineers and workers on their achievement. Oil resources had become a fundamental factor in Iraq's economy and, although Iraq was the first country in the Middle East in which oil was found in commercial quantities, its exploitation had been slower than it might have been. It was expected

H.E. Brigadier-General Fauzi Selo, accompanied by Colonel Adib Shishakli, inspect the Guard of Honour at Banias. It was unfortunate that the weather was far from suitable for such a ceremony.

that the inauguration of this line would mark the beginning of a new era for other schemes and be a stimulus to the oil companies to increase their efforts for production commensurate with the oil deposits in Iraq.

Stressing the Government's interest in the welfare of labour and in the training of Iraqis to take technical posts in the industry, the Minister urged the Company to give even greater attention to this matter.

The Banias Ceremony

At Banias the ceremony of opening the valve on the line to No. 6 loading berth, at which the 28,625-ton tanker *British Talent* was waiting for her cargo, was performed by the Syrian Chief of State and Prime Minister, H.E. Brigadier-General Fauzi Selo, who was accompanied by Colonel Adib Shishakli, Deputy Prime Minister and Chief of the General Staff.

Speaking at the luncheon after the inauguration ceremony, Sir John Cunningham said that, faced with the possibilities of expanding the existing loading installations at Tripoli or of seeking a new terminal on the Syrian coast, the Company decided, in view of the wishes expressed by the Syrian Government, to proceed with the construction of an entirely new terminal at Banias.

The tanks at Banias, being more than 50 metres in diameter and 18 metres high, were of the largest type ever constructed.

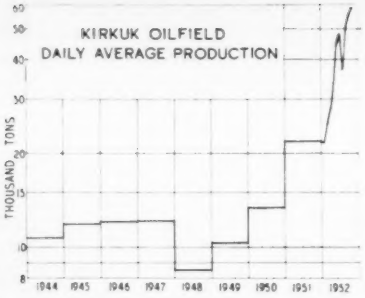
At Homs, Syria, and at Baiji, Iraq, the huge 30- and 32-inch pipes were "denested" and—

Thanking the Government for assistance received in carrying the work to its completion, Sir John said that the Company wished to commemorate the inauguration of the line and its appreciation of the presence of the Prime Minister and the Deputy Prime Minister by building and equipping a medical clinic in Banias. The Company also desired to make a donation of £50,000 for charitable purposes.

He concluded by referring to negotiations with the object of increasing the benefits to Syria from the pipeline undertaking. He was confident that they would soon result in a conclusion satisfactory to both parties.

—taken by lorry to the site and strung out ready for the construction gangs.

The huge Perrault wrapping machine wending its way slowly along the line.



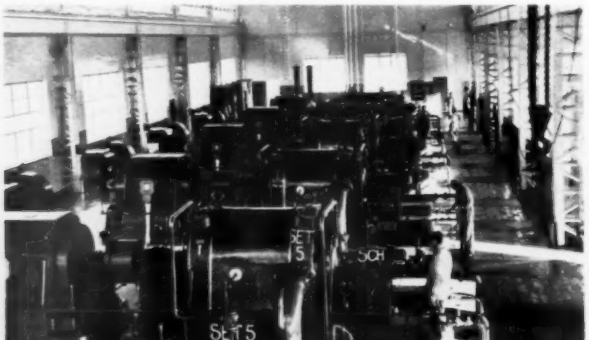
Daily average production of crude oil from the Kirkuk field. The drop in 1948 was due to the Arab-Israel war and the closure of the line to Haifa, but with the opening of the 16-inch pipeline in 1949 the curve quickly regained its normal trend. The effect of the 30-inch line is apparent from the rise of the curve during 1952.

Syrian Co-operation

H.E. Brigadier-General Fauzi Selo, replying to the toast, expressed Syria's thanks and appreciation for the generous feelings and congratulated the Company on the success of its efforts which constituted a victory for science and technology.

The Syrian Government welcomed international co-operation based on respect for the sacred rights and legitimate interests of the country. They welcomed the investment of foreign capital provided that Syria obtained a fair share of the profits and that the use of such capital was in harmony with their principles of independence, their economy, and their laws.

The pipeline project was of great importance to Syria and they considered themselves as partners in the project.



The interior of K.1 pumping station at Kirkuk where the crude oil starts its 555-mile journey through 30-inch, 16-inch and 12-inch pipelines to Banias and to Tripoli.

A reminder that the Middle East is not all sunshine. In the rainy season the pipeline ditch became a veritable river, but the work went on whatever the weather.

One requirement of the project was that Syria's share of the profits should be commensurate with her participation in the field of international economy and with the obligation imposed upon her.

Concluding, Brigadier-General Selo wished the project all success.

The Pipelines of Iraq

The first pipelines to be laid for the transport of Kirkuk crude oil to the Mediterranean seaboard were constructed during 1932-4, when a 531-mile 12-inch line was laid from Kirkuk to Tripoli, Lebanon, and a similar line, 617 miles long, from Kirkuk to Haifa, in what is now Israel. Both lines followed the same route from Kirkuk to Haditha on the River Euphrates, and then separated to reach their individual destinations.

Each line had a capacity of two million tons per annum and it soon became apparent that additional carrying capacity would be needed. Plans were therefore made to add 16-inch lines over the same routes, but unfortunately the war in 1939 caused them to be postponed. Consequently, construction did not commence until the autumn of 1946. By the spring of 1948 the southern line to Haifa was within 50 miles of its destination when the work was stopped by the outbreak of war between the Arab countries and Israel. To this day, the Iraq Government continues to refuse permission for crude oil to be passed through the lines to the refinery at Haifa, and the last 42 miles of the 16-inch line has never been laid.

The 16-inch line from Kirkuk to Tripoli was completed in July 1949 and its capacity of 5.5 million tons per annum enabled the production from the Kirkuk field to be stepped up to just over 7.5 million tons per annum.

With the demand for yet further production from Kirkuk it was obvious that additional transport capacity would soon be necessary to cope with the steadily increasing potential of the field. So, even while the 16-inch lines were being built, plans were being laid for the construction of a further line.

The 30-*inch Line*

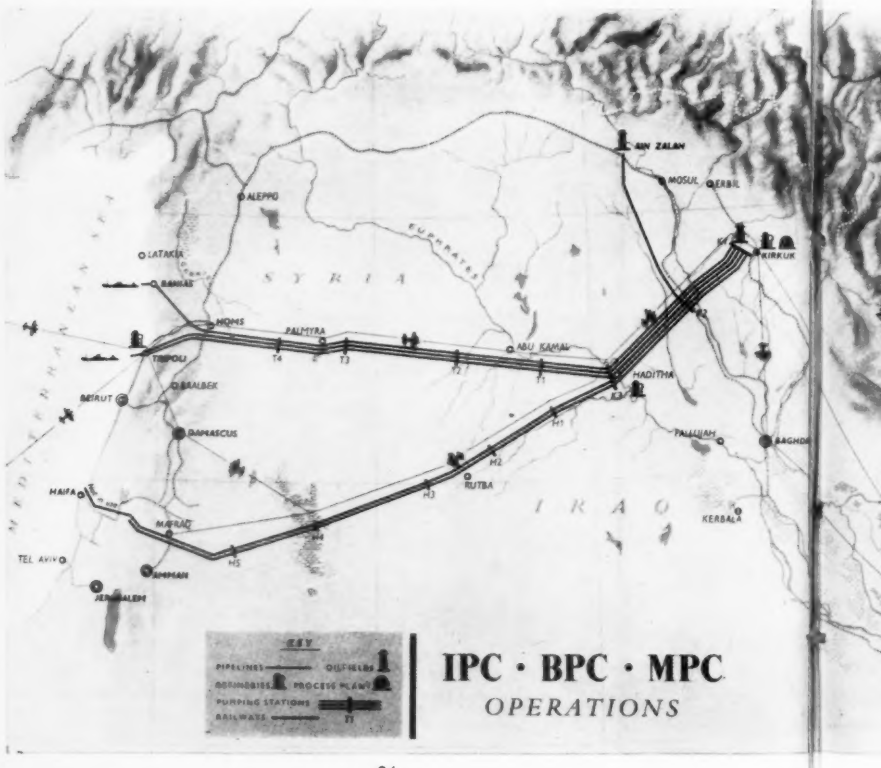
After full consideration of all the factors involved it was decided that the nominal diameter of the new line should be 30 inches and that its seaboard terminal should be at Banias, in Syria, on the Mediterranean coast 60 miles north of Tripoli.

At that time the only country capable of supplying the 165,000 tons of big diameter steel pipe was the United States and arrangements were made for Consolidated Western Steel Corporation, Los Angeles, to supply 143,000 tons of 30- and 32-inch pipe, and for the National Tube Co., Lorain, Ohio, to supply 22,000 tons of 26-inch pipe for use on the Homs Gap-Banias section of the line.

To facilitate pumping of the crude oil, the line was designed so that on the delivery side the line was 30-inches in diameter, changing to 32 inches as the next pumping station was approached. This decision was influenced also to some extent by the desire to economize in shipping space as it enabled the pipe to be nested with 30-inch sections inside 32-inch sections. Each section was 31 feet in length.

For the trans-ocean journey to Basrah and to Tripoli from the U.S.A., 35 vessels were specially chartered from Furness Lines Ltd., each vessel carrying about 18 miles of pipe. At Tripoli, the pipe was off-loaded into tank-landing craft or barges and then carried to its destination in specially designed "Antar" lorries.

At Basrah the pipe was transferred to railway wagons for the journey to Kirkuk, where it was taken by road to its destination. Altogether some 50 million ton miles were involved in



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OPERATIONS

bringing the pipe from ports to site.

The pipe for the length of the line west of the Euphrates was first taken to Homs, where a large storage yard had been prepared and special plant provided for de-nesting the 30- and 32-inch pipes. After separation, the pipe was machine-welded into 93-feet lengths consisting of three sections. These lengths were then transported to their position on the line by the huge 250-b.h.p. Thornycroft "Mighty Antars," each of which carried nine lengths of pipe weighing about 65 tons.

For the reception of the pipe a trench 5 to 6 feet in depth and 4 feet in width had to be dug and some 3 million tons of earth had to be shifted. A considerable part of the trenching was through rock, which not only involved blasting but also meant that the line had to be padded all round with sifted earth to prevent damage by rock.

Corrosion protection is not the least of the problems associated with buried pipelines, and the Company had made a lengthy study of this factor, and a valuable paper* on cathodic protection in Iraq has been written by W. C. R. Whalley, the Company's corrosion engineer. For the 30-inch line there was also employed the "double coat, double wrap" technique devised by IPC engineers. After the welds had been tested the line received a priming coat and then the huge coating and wrapping machine followed. This machine first flooded the line with hot (525°F) coal-tar enamel, then wrapped it with glass fibre, followed by a second coat of enamel, and a final wrap with asbestos felt.

Work on the construction of the 30-inch line commenced in November 1950 and was fully completed, six months ahead of the original schedule, in April 1952. Its route across the desert is marked by a slight rise in the ground above the buried line and a trail of silver-coloured telegraph posts. The completion of this line is a tribute to the skill and labour of the 300 British, 90 American, and 7,000 Arab technicians and workmen who contributed to its construction.

Some facts concerning the 30-inch line are:

Cost: £41 million.

Length: 555 miles.

Diameter: 32, 30 and 26 inches.

Total weight: 165,000 tons.

Thickness: 7/16 and 3/8 inch.

Vehicles used in laying: 510 transport vehicles and 670 pieces of laying equipment.

Ditch: 5-6 ft. deep, 4 ft wide.

J. Inst. Petrol., 1949, **35**, 705-34.

Preparing to take the wrapping machine off the last section of the line—

Corrosion protection: 4,000 miles 18-inch glass fibre; 21,000 tons tar enamel; 4,000 miles 18-inch asbestos paper.

Stores: 40,000 spares and general items; 11,500 tons materials; 300 tons welding rod; 490 tons explosives; 100,000 rip bits; 5,600 tyres; 29 miles of film to photograph welds.

Commissariat: Over 2¼ million meals; monthly consumption (up to) 42 tons bread, 27 tons meat and poultry, 50 tons fruit and vegetables, and 190,000 eggs.

With the completion of the 30-inch line the pipelines now carrying Iraq crude oil to the seaboard for transport to overseas markets are:

Route	*Diameter inches*	*Length miles*	*Capacity tons per year*
Kirkuk-Banias	30	555	14,000,000*
Kirkuk-Tripoli	16	531	5,500,000
	12	531	2,200,000

Other pipelines in Iraq belonging to IPC and associated Companies are:

Route	*Diameter inches*	*Length miles*	*Status*
Ain Zalah-K.2	12	134	Tied into Tripoli line at K.2
Kirkuk-Haifa	16	575	Incomplete and closed
	12	617	Closed
Zubair-Fao	12	75	In use
	24	75	Under construction

*Including Mosul production.

Pump Stations

For the 12- and 16-inch lines between Kirkuk and Tripoli, there were seven pumping stations, three (K.1 to K.3) between Kirkuk and Haditha on the River Euphrates and four (T.1 to T.4) between the river and Tripoli. The K stations were built to service both the Tripoli and Haifa 12-inch lines and each had a pumping capacity of 11,200 tons/day. The four T stations had a capacity of 5,600 tons/day at 800 p.s.i., as had the five stations (H.1 to H.5) on the Haditha-Haifa leg. When the 16-inch lines were built the capacities of all K stations were doubled.

For the combined 12-, 16- and 30-inch lines new stations have been erected at T.2 and T.4 and at the other stations new plant has been added to bring pumping capacity up to a total sufficient for all lines. Eventually each station will have a total capacity of 25 million tons/day with eight pumping units, five of which will be allocated to the 30-inch line.

The Banias Terminal

The Mediterranean terminal of the 30-inch line is located at Banias, in Syria, some 31 miles south of Latakia. Actually the terminal is about two miles north of the town of Banias.

—which is given its final preparation prior to—

—being lowered into the ditch to complete the job.

Today the terminal presents a busy scene with its huge tanks 164 feet in diameter and 56 feet high, its garages, its workshops and stores, its housing and canteen facilities, and its small-boat harbour.

As planned, the tank farm will include 23 storage tanks, each capable of holding 28,000 tons (7¼ million gallons) of crude oil. At the time of the formal opening 16 of the tanks had been erected and 12 were in use. The tank farm is located on a rise overlooking the sea and at present the oil flows by gravity through a manifold to the six, 24-inch, deep-sea loading lines. Pumps, to speed up the loading process, are to be installed, and when the station is in full operation not less than 100 tankers will be loaded each month and the present speed of loading—1,200 tons/hour—will be doubled.

The 24-inch sea loading lines are laid on the sea bed to a distance of about 1¼ miles from the shore. Each line terminates in two 10-inch diameter flexible hoses attached to marker buoys. When the tanker is securely moored, these flexible hoses are hauled on board and connected to the ship's tanks. Signals are exchanged with the shore and loading commences with no delay.

First shipment of oil from the new terminal was on 12 April 1952, and a remarkably high rate of shipment has been maintained since that time, as shown by the following figures:

1952	*Tankers loaded*	*Tons loaded*	*Average tons per day*
April	13	223,703	11,774
May	44	692,829	22,349
June	43	644,568	21,486
July	43	628,261	20,266
August	57	840,040	27,098
September	74	1,107,402	36,913
October	66	989,038	31,904

The last weld is made amid much excitement from some of those who had made it possible—

—and IPC engineers (left), F. C. Ryland and F. E. O'Connor, shake hands with Bechtel engineers.

Action on board. Like a huge sea serpent the flexible hose is hauled on to the tanker.

"*The Third River*"

To commemorate the completion of the 30-inch pipeline and as a tribute to the people who built it and to those whose co-operation made it possible, the Company has prepared a film which had its premiere in England at Grosvenor House on 20 November. The film was accorded an enthusiastic reception by a large audience.

The title "The Third River" has been chosen to indicate that oil, like the Euphrates and the Tigris, is another river capable of bringing new wealth to Iraq and fertility to her lands as the result of wise use of that wealth in developing irrigation and similar schemes.

Starting with some very fine shots of the ruins of those cities and temples which were once the splendour of the Middle East, the cradle of civilization, there is then a fascinating account of the building of the pipeline and its ancillary services. At no time is there a dull moment. To those who saw the line building the film brought many memories of a job well organized and well done.

The foregoing account of the inauguration of the pipeline from Kirkuk to Banias was made possible through the courtesy of the Iraq Petroleum Company in inviting the Editor to be present at the ceremony at Banias, and also for supplying the photographs used for illustration.

Taking on the first cargo for Britain in April 1952. The tanker Barren Hill *loading 15,000 tons for Fawley.*

★ ★ ★

CITY AND GUILDS INSIGNIA

The City and Guilds of London Institute announces the establishment of an Insignia Award in Technology (C.G.I.A.) which is intended to be a mark of distinction for those who have combined with a sound practical training an adequate knowledge of the fundamental scientific principles of their industry, and who possess a capacity for leadership and administration. The award will also encourage those who have been trained in some branch of industry to widen their knowledge, and it will provide an indication of exceptional competence.

The list of industries in which the award will be available indicates the wide field of the scheme. Under "chemical industries" is included "petroleum and petroleum products".

Application for details and registration forms should be sent (with a stamped addressed foolscap envelope) to The Director, Department of Technology (1A), 31 Brechin Place, London, S.W.7.

★ ★ ★

OIL SEARCH IN EAST AFRICA

An air-photo reconnaissance of coastal Tanganyika, Zanzibar and Pemba Islands, and parts of Kenya is the first step in a programme of geological and physical surveys to be carried out in East Africa by D'Arcy Exploration Co., in conjunction with Royal Dutch-Shell.

Ground surveys of various islands of the coast and of the mainland are to be made by parties using the British Tanker Co's survey vessel *Burgan*.

Preliminary examination of the stratigraphy of the region was carried out in 1951 by Dr P. E. Kent of AIOC and Dr E. Kundig of Shell.

★ ★ ★

Sigmund A-N Chemical Pump is the subject of an informative pamphlet obtainable from Sigmund Pumps Ltd., Terminal House, Grosvenor Gardens, London, S.W.1.

PERSONAL NOTES

Dr E. V. Murphree, president of Standard Oil Development Company, has been awarded the medal of the Industrial Research Institute for 1953. This medal is awarded annually for outstanding accomplishment in leadership in or management of industrial research, and will be presented at the Annual Dinner of the I.R.I. next April.

H. Shaw has retired after 31 years service with the Shell group. A first world war pilot and a pioneer of commercial flying, he joined Shell-Mex Ltd. in 1921, becoming manager of the aviation racing and competition department a year later. In 1932 he transferred to the Asiatic (now Shell) Petroleum Co, to take up a senior appointment in the aviation department.

S. L. Neppe, F.Inst.Pet., has recently received the degree of D.Sc.(Eng.) in Chemical Engineering in the University of Witwatersrand, his thesis being the papers on the classification of bitumens in asphalt technology which appeared recently in the *Journal* of the Institute. He has also recently been admitted to the full membership of the Institution of Chemical Engineers.

The following changes have been made among Shell-Mex and B.P. Ltd. divisional managerial staff: **G. F. Steel** transfers from Manchester to become bitumen manager, Northern Division, at Newcastle-upon-Tyne, in succession to **J. P. D. Kierans**, who has been promoted to another appointment in the company. **L. E. Wells** leaves Ipswich to become bitumen manager, North Eastern Division, at Leeds. He succeeds **R. F. Knight**, who has been promoted to another appointment.

PETROLEUM IN PARLIAMENT

Freight Charges

The Minister of Fuel and Power was asked on 10 November if he was aware that although he accepts for the assessment of maximum prices of petroleum products freight charges based on a two-year time charter of tankers, these products are actually shipped by the major oil companies in their own tankers or in tankers chartered on a long period time basis, and as the actual freight costs are substantially below those which he has hitherto accepted, if he will reconsider the matter.

Mr Geoffrey Lloyd (in an oral answer): My Right Hon. Friend the Minister of Transport and I consider the brokers' award to be a fair index to the market rates and I do not think it would be wise to change the system.

British Oil Interests in Burma

The Foreign Secretary was asked on 19 November what contractural relations were entered into as a result of negotiations conducted by his department between British oil interests in Burma and the Government of Burma after the war.

In a written reply Mr A. J. Nutting, Joint Under-Secretary, said that under the Notes annexed to the Treaty of Recognition of Burmese Independence, the Government of Burma undertook to provide equitable compensation in the event of expropriation or acquisition of existing U.K. interests.

In March 1949 H.M. Government invited the Burmah Oil Co. and Associated Companies to continue rehabilitation work and guaranteed the Company against losses. These arrangements terminated on 31 January 1950 and were discharged by payment of £800,000 to the Company.

In September 1951 H.M. Government offered a loan of £2½ million to help finance a joint oil venture provided the Government of Burma and the oil companies were able to conclude satisfactory arrangements. Agreement has been reached for the Burmese oil industry to be operated by a new company in which the Government of Burma and the companies would participate but has not yet been finalized.

Malta Oil Prospecting

Asked why a licence to prospect for oil in Malta had been refused by the Governor, the Colonial Secretary, in a written reply on 19 November said that the granting of such licences was the responsibility of Maltese Ministers.

Replacement of Trams (Oil Consumption)

Arising from the withdrawal of electric trams by municipalities and their replacement by oil and petrol-driven buses, the Minister of Fuel and Power was questioned (24 November) on the resultant increased oil consumption. He said: There may result an increase of some 20,000 tons a year in oil consumption and a decrease of about 100 million units of electricity a year. It is the policy of the Government not to interfere, on fuel grounds, with the free choice of types of vehicle.

Natural Gas (Extraction)

There are current in the U.K. 42 licences to search and bore for petroleum, including natural gas from petroleum-bearing strata, covering 6,500 sq. miles, the Minister of Fuel and Power said on 24 November.

AIOC

In a written answer on 24 November, the Minister of State for Economic Affairs said: The two Government-appointed directors upon the Board of the Anglo-Iranian Oil Company are Field-Marshal the Viscount Alanbrooke and Sir Thomas Gardiner.

Lord Alanbrooke was appointed on 1 August 1946, and Sir Thomas Gardiner

on 16 February 1950, both for five years in the first instance. Lord Alanbrooke's appointment was extended for one year on 1 August 1951, and again on 1 August 1952. The only directions given to these directors on their appointment were with regard to the channel through which any reports that they wished to make should be submitted to H.M. Government.

Answering a supplementary question (27 November), the Economic Secretary to the Treasury said: The authorized capital of the Anglo-Iranian Oil Company is £33 million. Out of a total of £20,137,500 of issued ordinary stock H.M. Government own £11,250,000, i.e., about 56 per cent. Out of a total of £12,706,252 of issued preference stock H.M. Government hold £1,000.

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COUNCIL COMMENTARY

The October 1952 meeting of Council was presided over by Prof F. Morton, and a welcome was given to Mr George Noble, O.B.E., who had been co-opted to fill the vacancy caused by the death of Mr H. de Wilde.

An interesting discussion took place on By-Law 28 which states that candidates for transfer from one grade of membership to another may not be notified if their application is unsuccessful. Some scientific societies send a formal letter of regret in the circumstances and the Institute's solicitors are of the opinion that there is no reason why this should not be done. It was left to the General Secretary to draw up, in conjunction with the solicitors, a draft of a printed form of letter to be used for notification.

Publications Committee have considered the desirability of strengthening the Papers Sub-Committee, which is responsible for obtaining suitable papers for reading at General Meetings and for publication in the *Journal* and the *I.P. Review*. It has been decided to invite representatives of the engineering, geological, and production sides of the industry to serve.

A discussion on the cost of the Institute's publications followed. In addition to its periodicals the Institute publishes "Annual Reviews", "Modern Petroleum Technology", and many other books. The cost of producing these has risen steeply during recent years and a large amount of capital is now tied up in this way. Publications Costing Sub-Committee is considering the matter and will report in due course to their parent committee and through them to Council.

The first item discussed at the November meeting was the nomination of President for 1953/4. Mr T. Dewhurst proposed that Mr H. S. Gibson, C.B.E., be nominated for a second year of office and this was enthusiastically agreed by Council. The President then joined the meeting and was informed of Council's wishes. He agreed to his nomination going forward and from the chair thanked Council for its support during his term of office. Following this Mr G. H. Coxon was unanimously nominated as Hon. Treasurer and Mr C. Chilvers as Hon. Secretary for the next session.

Two vacancies for vice-presidents for 1953/4 had been balloted for and as a result Mr J. A. Oriel, C.B.E., M.C., and Mr G. H. Thornley have been nominated.

It was decided to amend By-Law 28 to allow the General Secretary to notify candidates for transfer if their applications are unsuccessful. A standard form of printed letter was agreed and a Special General Meeting will be held in December to approve the alteration to the By-Law.

At the request of the new French standardizing body, the Bureau du Normalisation du Pétrole, Standardization Committee arranged a series of meetings at 26 Portland Place with five of the French representatives, including their president. The visit culminated with an official luncheon followed by a meeting of the Standardization Committee. This took place at the 96 Restaurant, Piccadilly, and was well attended.

A proposal was made that an IP Legal Sub-Committee be set up to advise committees and sub-committees on the legal aspect of their work. Council deferred a decision on this pending further consideration.

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SUBMARINE DRILLING OFF BRITISH BORNEO

A submarine drilling operation, the first in the British Commonwealth, has been initiated by Shell in the endeavour to find an undersea extension to the Seria oilfield, British Borneo. A single fixed platform, covering 110 by 45 ft and capable of supporting a weight of up to 200 tons, has been designed, from which four separate undersea wells can be drilled. The foundation for the platform, a tubular steel jacket, is prefabricated in harbour, carried out to a selected location, and fixed in position on the sea bed. During the long spells of stormy weather encountered in the South China Sea, vessels cannot be brought alongside the platform on account of the heavy swell. For this reason, an aerial ropeway will connect drilling platform with shore.

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Aden Refinery. The liner *Dorsetshire* is to be used as a floating camp for construction personnel in the early days of the building of AIOC's 5-million ton refinery at Aden. As well as the refinery, which will take some two years to complete, an oil port covering 50 acres is to be constructed.

FORTHCOMING MEETINGS

THE INSTITUTE

Geophysics — Its Problems and Trends. D. T. Germain-Jones, B.Sc., Ph.D., D.I.C., A.R.C.S. (*Anglo-Iranian Oil Co. Ltd.*). At 26 Portland Place, London, W.1, 5.30 p.m. (*tea* 5 *p.m.*), 28 January.

Comments on Entry into Western Canadian Oil Operations. C. S. Lee, A.R.S.M. and R. O. Young, Ph.D. (*Trinidad Leaseholds (Canada) Ltd.*). At 26 Portland Place, London, W.1, 5.30 p.m. (*tea* 5 *p.m.*), 11 February.

Production and Utilization of Petroleum Raw Materials in the U.K. Chemical Industry. Joint Meeting with London Section, Society of Chemical Industry. At Institution of Electrical Engineers, Savoy Place, London, W.C.2. 10 a.m. to 5.30 p.m., 2 March.

The International Labour Office and the Petroleum Industry. T. T. Scott (*Shell Petroleum Co. Ltd.*). At 26 Portland Place, London, W.1, 5.30 p.m. (*tea* 5 *p.m.*), 11 March.

Fawley Branch

Annual General Meeting and Films. At Esso Recreation Club, Holbury, 7.30 p.m., 16 January.

Tanker Construction. James Melville, M.I.N.A. At Esso Recreation Club, Holbury, 7.30 p.m., 20 February.

London Branch

Petroleum Waxes. S. T. Minchin. At 26 Portland Place, London, W.1, 6 p.m. (*tea* 5.30 *p.m.*), 21 January.

Petroleum Chemicals in Great Britain. R. F. Goldstein, B.Sc., Ph.D., F.R.I.C. At 26 Portland Place, London, W.1, 6 p.m. (*tea* 5.30 *p.m.*), 23 February.

Northern Branch

The Use and Character of New Chemicals from Petroleum. Dr E. S. Paice. At Engineers' Club, Albert Square, Manchester, 6.30 p.m., 20 January.

Annual General Meeting and Brains Trust. At Engineers' Club, Albert Square, Manchester, 17 February.

Scottish Branch

Films. At Engineering Centre, Glasgow, 10 February.

South-Eastern Branch

Drilling and Producing. H. C. Carter (*Le Grand Sutcliffe and Gell*). King's Head Hotel, Rochester, 7.45 p.m., 3 February.

South Wales Branch

Annual General Meeting. At Training Centre Cinema, National Oil Refineries, Ltd., Llandarcy, 5.30 p.m., 5 February.

Stanlow Branch

Annual General Meeting followed by "Any Questions". At Grosvenor Hotel, Chester. AGM 7.30 p.m.; "Any Questions" 8 p.m., 20 January.

Methane at Point of Ayr Colliery. S. J. Young. Joint Meeting with Institute of Fuel. At Grosvenor Hotel, Chester, 7.30 p.m., 18 February.

OTHER SOCIETIES

Instrumentation in a Chemical Factory: pH Measurement and Control. J. W. Broadhurst, B.Sc. Joint Meeting Society of Chemistry and Royal Institute of Chemistry. At Harris Institute, Preston, 7.30 p.m., 28 January.

Practical Aspects of Modern Trends in Coating Protection of Buried and Submerged Structures. H. Footner and K. A. Spencer. Society of Chemical Industry. (Joint Meeting with Chemical Engineering, Newcastle Section and Corrosion Groups.) At Stephenson Building of Durham University, Newcastle, 18 February.

Stability of Asphalt Mixtures as Affected by Aggregate Size. Dr D. H. Knight. Society of Chemical Industry (Road and Building Materials Group). At Building Centre, Store Street, London, W.C.1, 6 p.m., 19 February.

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Oil and Steel is the title of Shell's 36-page booklet describing the lubrication system of the "Abbey" steel works of the Steel Company of Wales. Shell were appointed lubrication consultants and also are suppliers of oils and greases for the plant. The booklet is illustrated by many excellent photographs and there is a lubrication chart of the plant.

★ ★ ★

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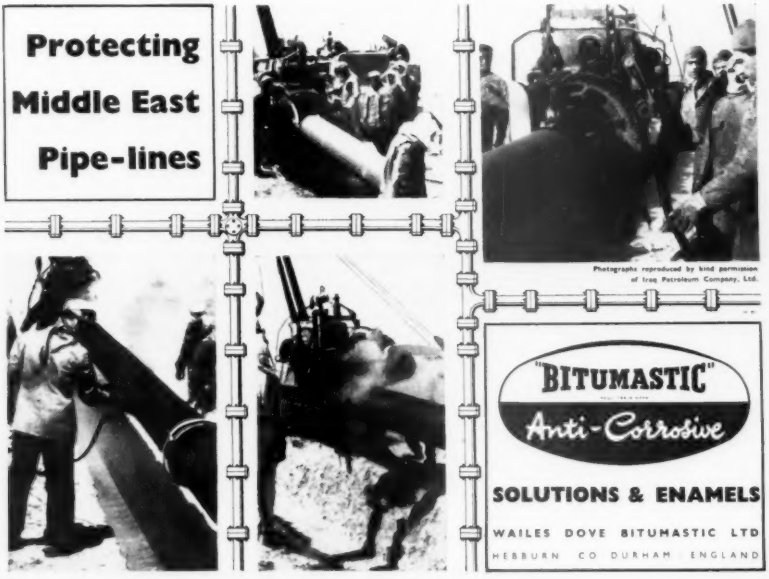

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The 31-foot lengths of 30-inch pipe manufactured for the Iraq Petroleum Company were frequently pre-welded into 93-foot lengths before being taken into the desert for welding together into the 556-mile pipe-line from Kirkuk in Iraq to Banias in Syria. Lincoln electrodes being used in both operations.

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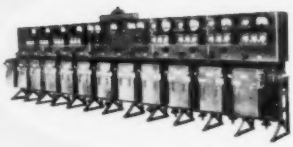

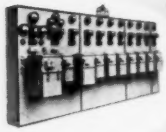

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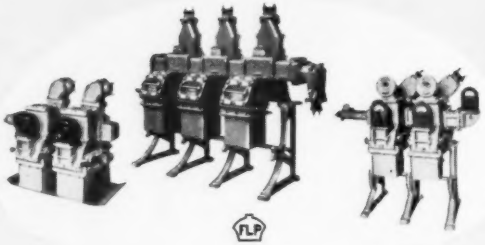

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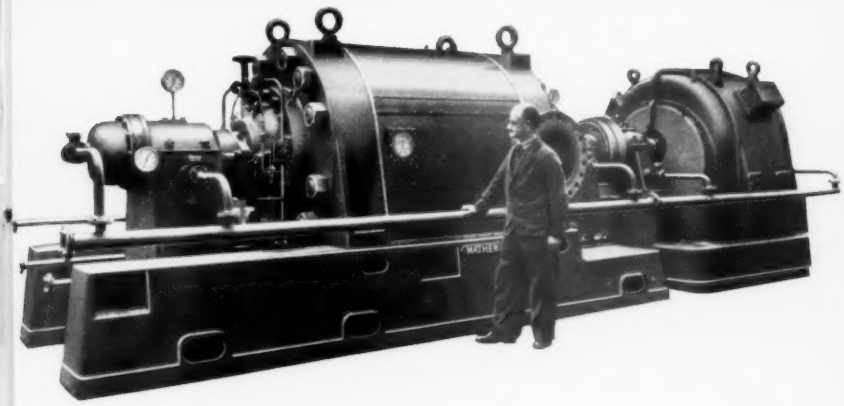

M & P Centrifugal Pumps on the Kirkuk-Banias Pipeline

Illustrating one of a series of electrically driven centrifugal pumps as supplied by Mather & Platt Ltd. to the Iraq Petroleum Co.

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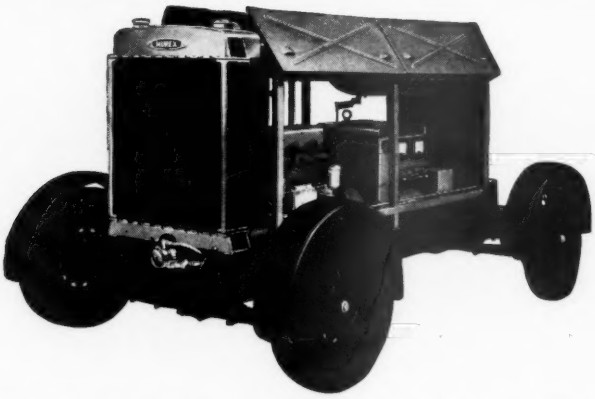

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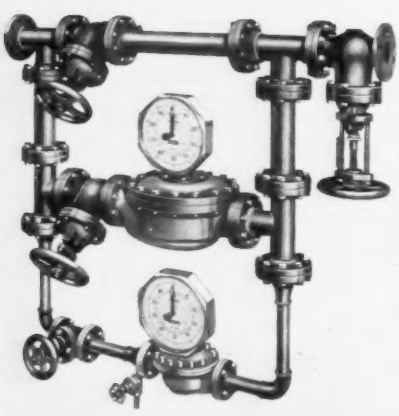

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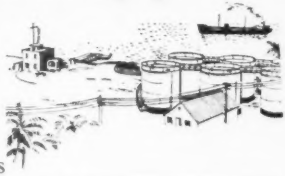

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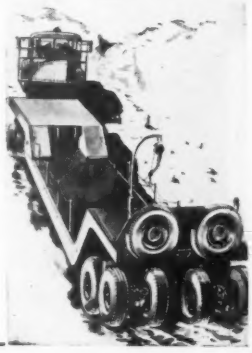

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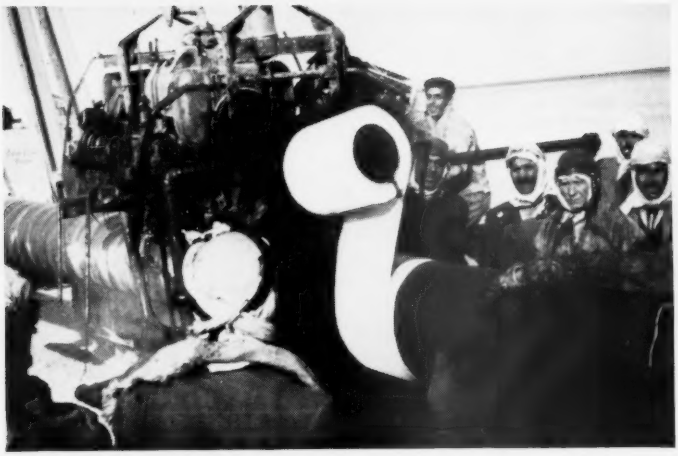

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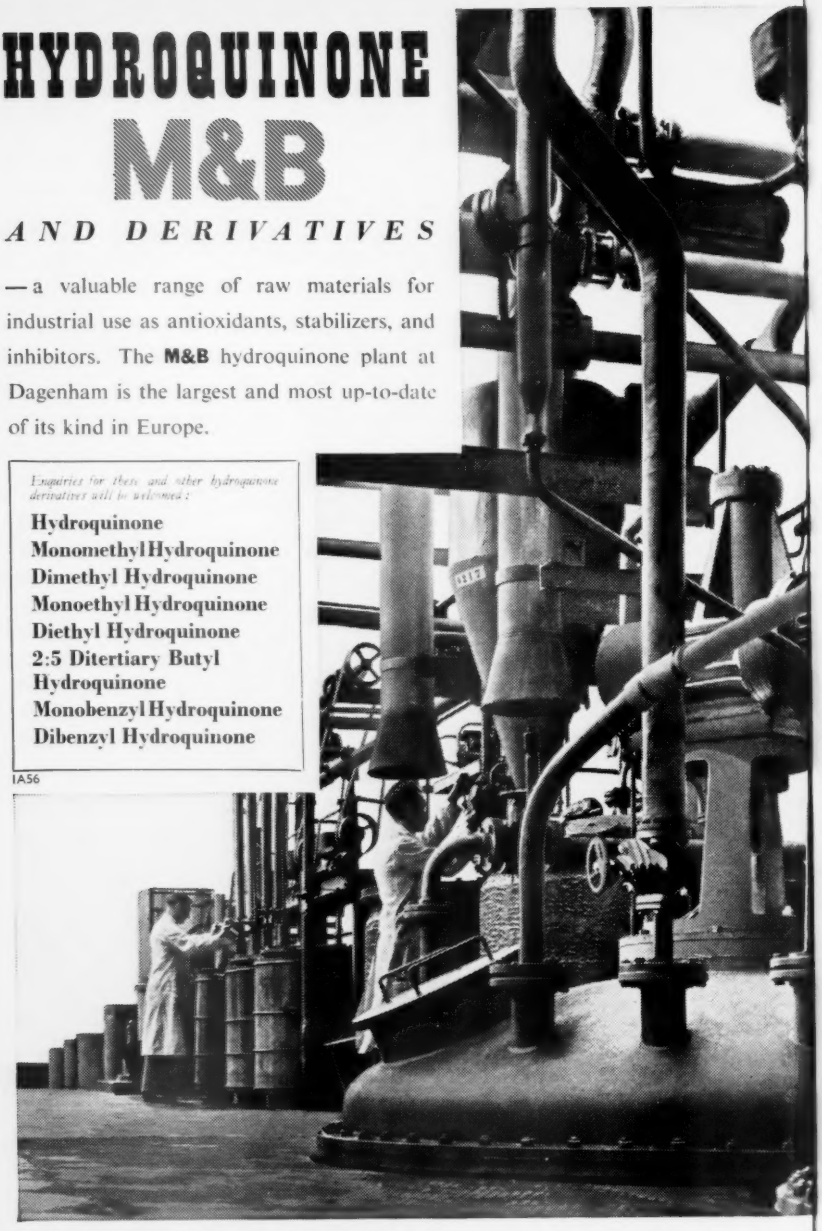

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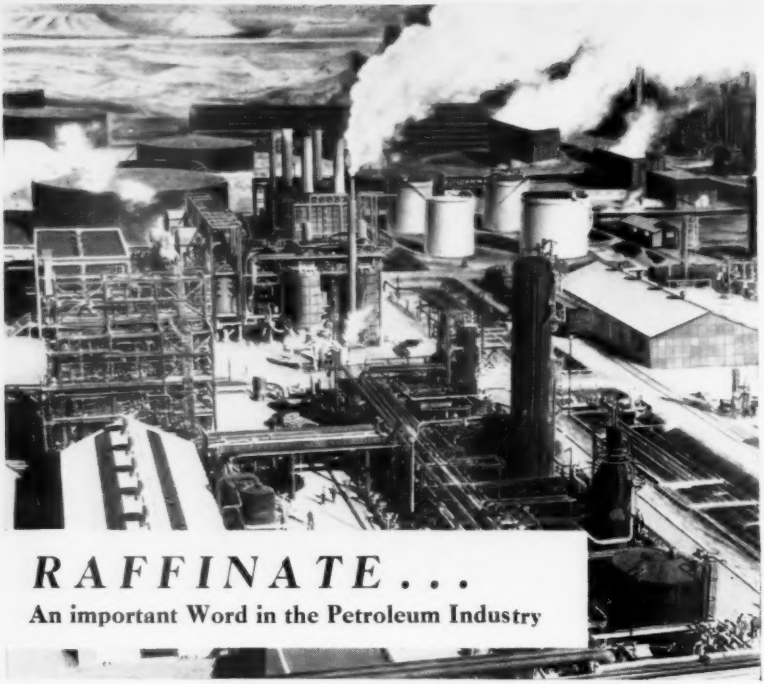

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